Fig. 1

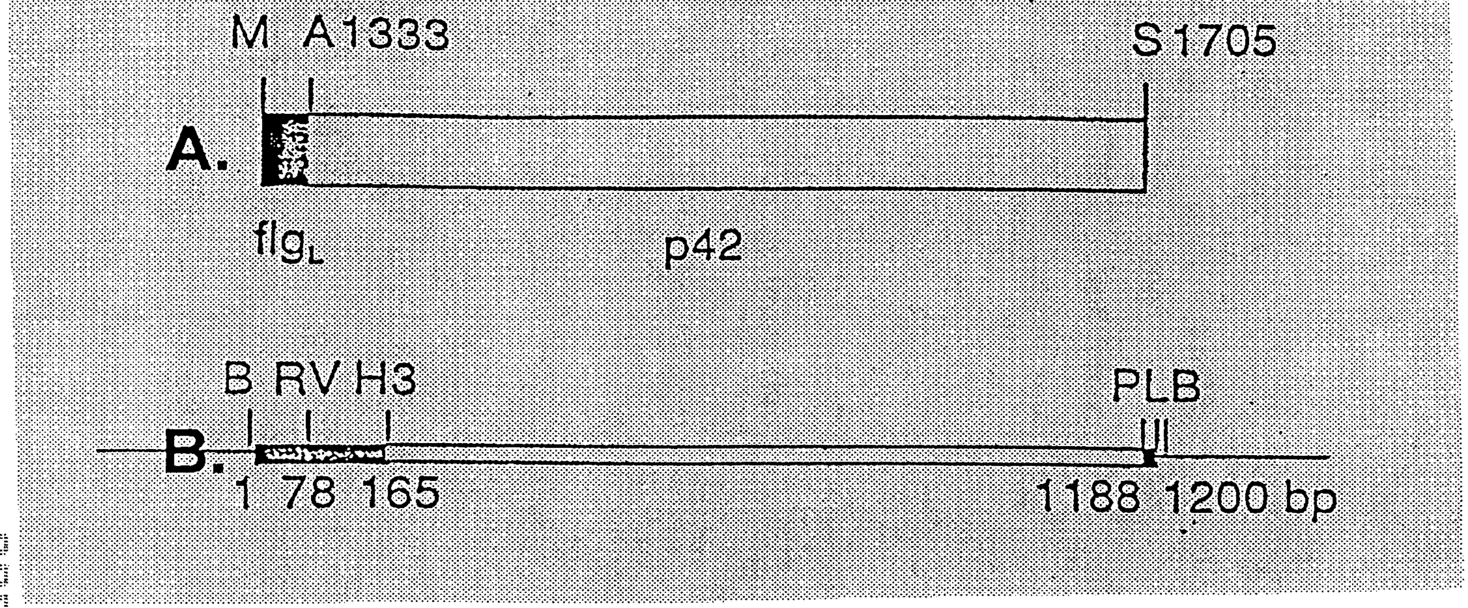


FIGURE 13

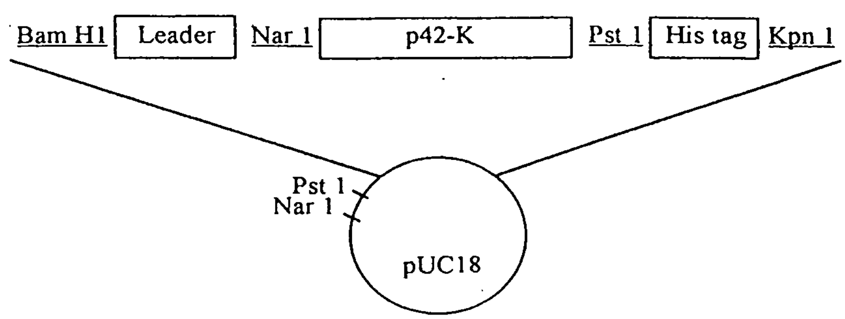


Fig. 2

Fig. 2A

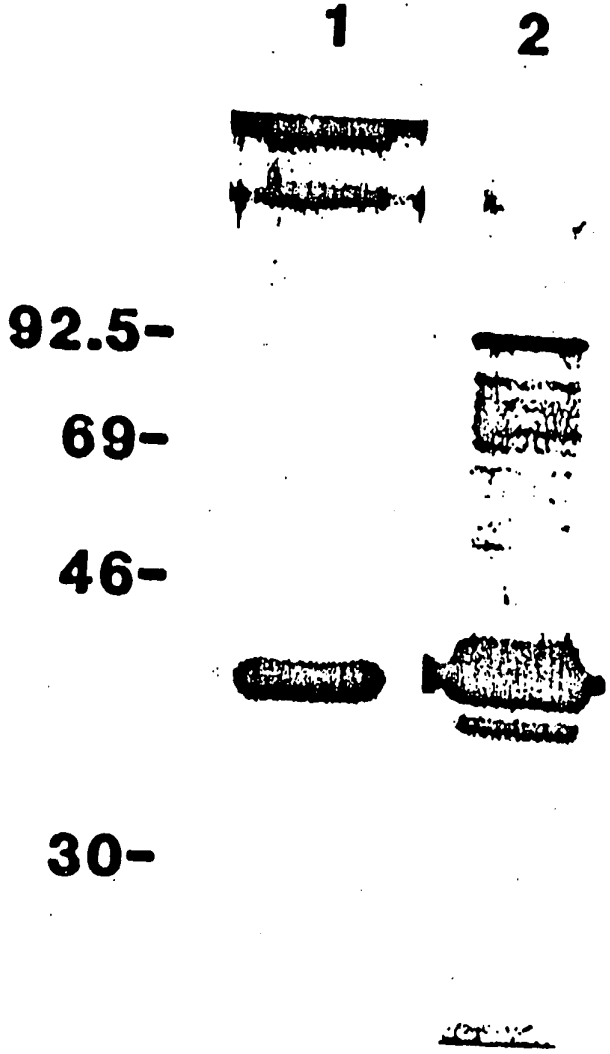


Fig. 2B

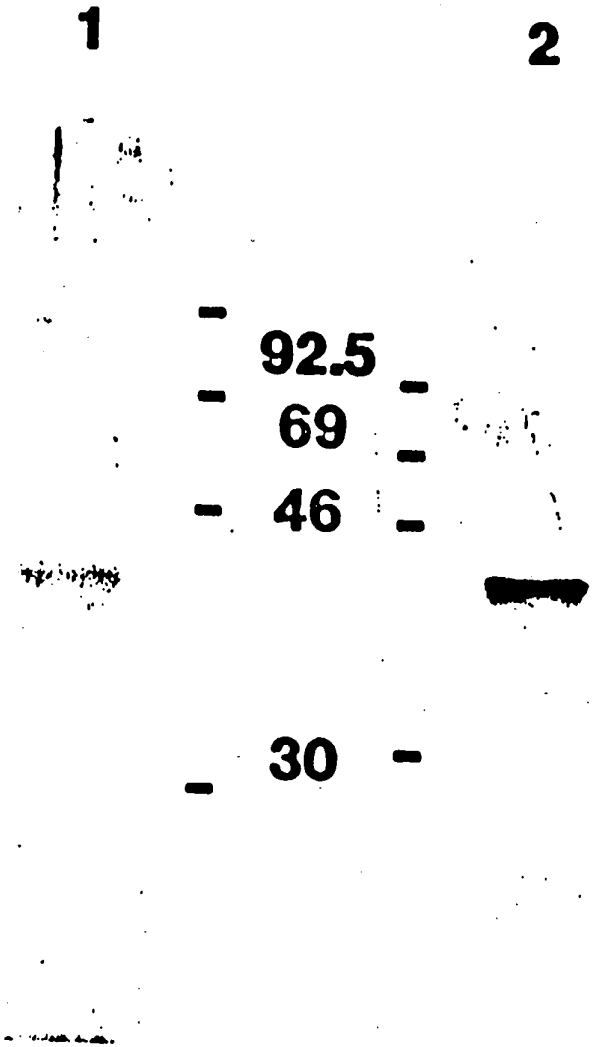


Fig. 3

Fig. 3A

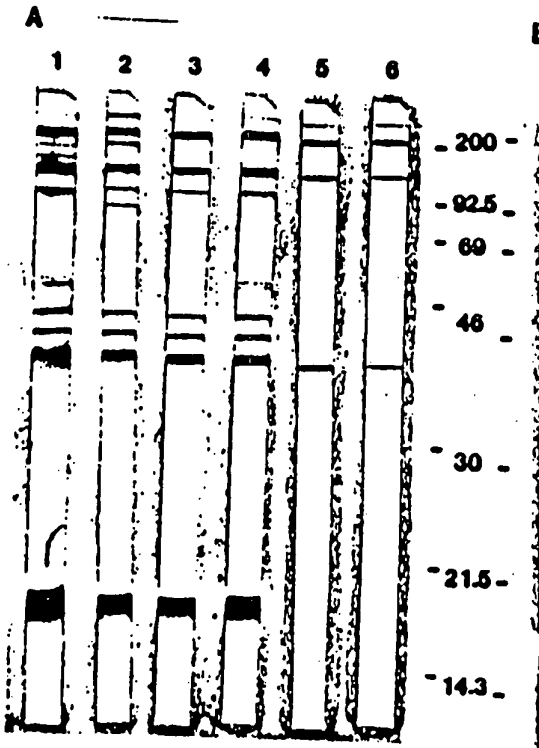


Fig. 3B

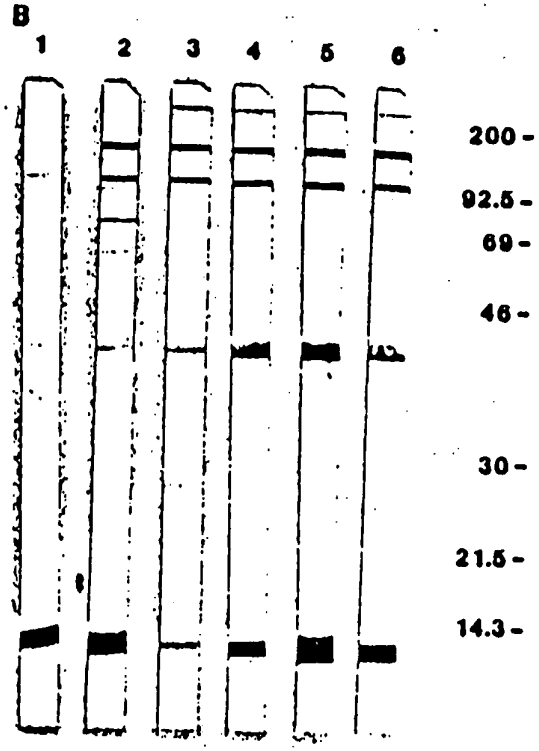


Fig. 3C

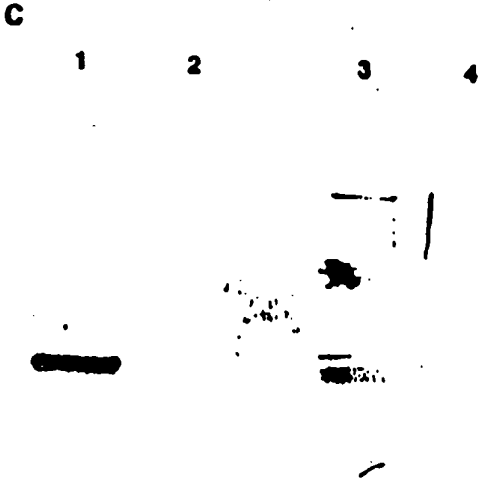


Fig. 4

Fig. 4A

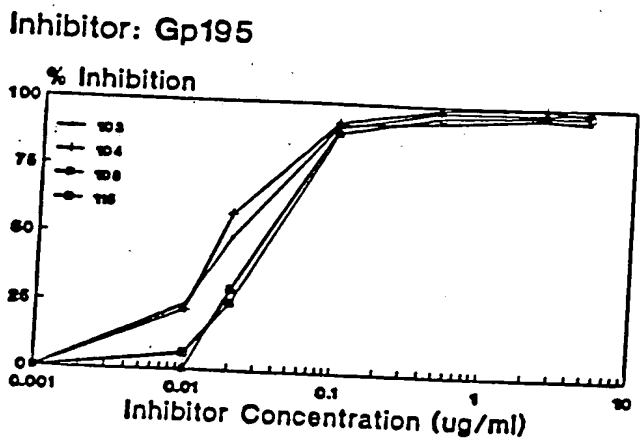


Fig. 4B

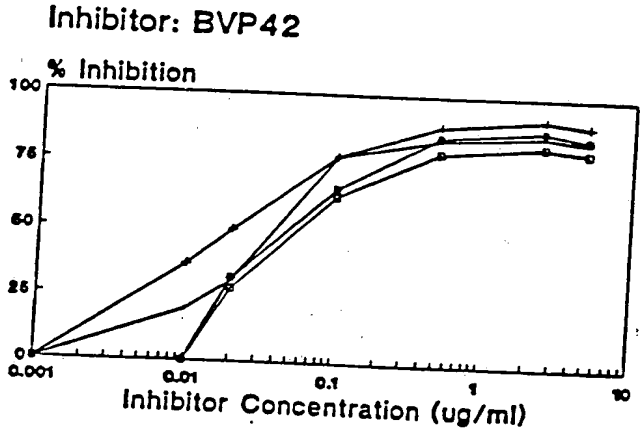


Fig. 4C

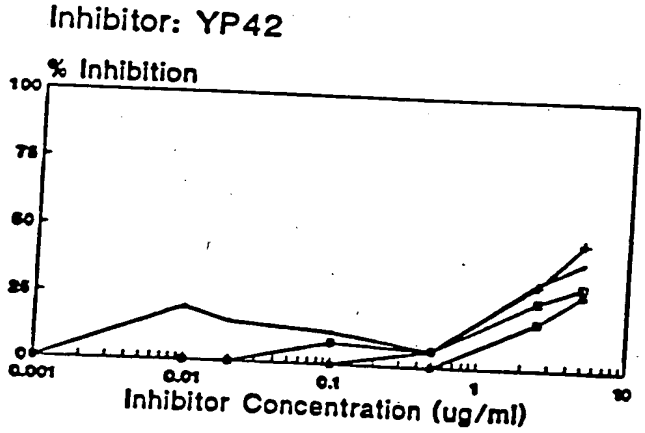


Fig. 5

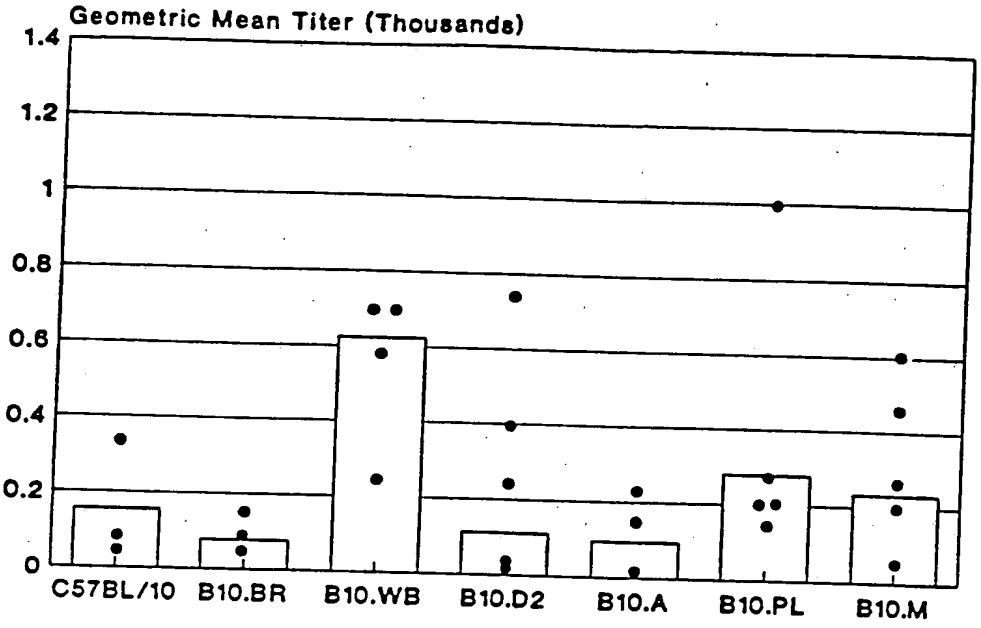
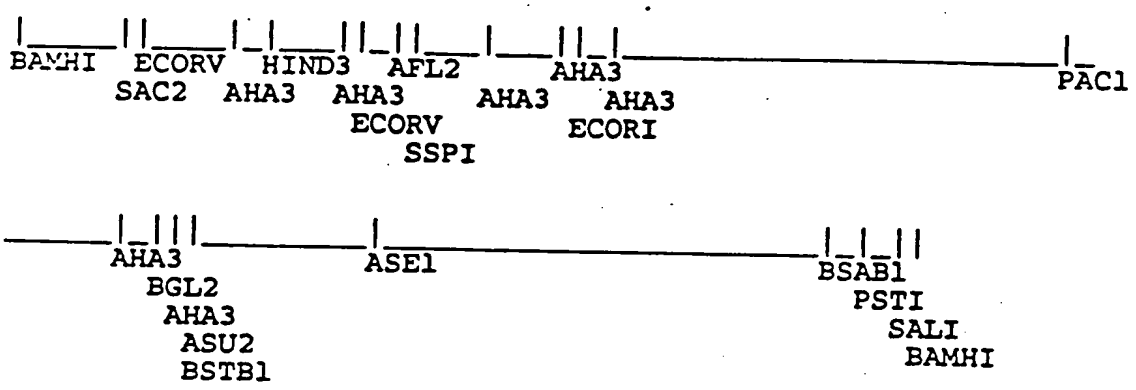

Geometric Mean Titer (Thousands)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
C57BL/10
B10.BR
B10.WB
B10.D2
B10.A
B10.PL
B10.M

Fig. 6

008020"92E00560

```
                                                                   I
FUP  AISVT.MDNILSGFENEYDVIYLKPLAGVYRSLKKQIEKNIFTFNLNLNDILNSRLKKRKYFLDVLESDLM  1402
MAD                                                                          1377
WEL   VTTSVI    KI    E L                  L N VM  V VK    FN  EN KN     I   1384
K1    VTPSVIH   KI    E L                  L N VM  V VK   PFN  EN KN     I   1325

                         I
FUP  QFKHISSNEYIIEDSFKLLNSEQKNTLLKSYKYIKESVENDIKFAQEGISYYEKVLAKYKDDLESIKKVIK  1473
MAD                                                                          1448
WEL  PY DLT SN VVK PY F  K KRDKF S  N  D IDT N NDVLG KILSE  S  D      Y N     1405
K1   PY DLT SN VVK PY F  K KRDKF S  N  D IDT N NDVLG KILSE  S  D      Y N     1396

                                                                 ∞
FUP  EEKEKFPSSPPTTPPSPAKTDEQKKESKFLPFLTNIETLYNNLVNKIDDYLINLKAKINDCNVEKDEAHVK  1544
MAD                                                                          1519
WEL  ..................... K GENE Y  N   KTVND  LFV H E VLNYTY SNVE           1456
K1   ..................... K GENE Y  N   KTVND  LFV H E VLNYTY SNVE           1447

                                                                            ◇
FUP  ITKLSDLKAIDDKIDLFKNHNDFEAIKKLINDDTKKDMLGKLLSTGLV.QNFPNTIISKLIEGKFQDML.N  1613
MAD                      T                                  I                1588
WEL   KE NY  T Q  LAD  KN N VG AD ST YNHNNL T F    M FE LLKSVL N LDW LARYVKH  1527
K1    KE IY  T Q  LAD  KN N VG AD ST YNHNNL T F    M FE LLKS L N LDW LARYVKH  1518

          o    o    •         • •          •     ◆  •    •    •
FUP  ISQHQCVKKQCPENSGCFRHLDEREECKCLLNYKQEGDKCVENPNPTCNENNGGCDADAKCTEEDSGSNGK  1684
MAD                                             E                 T      SR  1659
WEL  FTTPMRK TMIQQS                                                           1598
K1   FTTPMRK TMIQQ                             S                             1589

        • •   o      •  →
FUP  KITCECTKPDSYPLFDGIFCSSSNFLGISFLLILMLILYSFI
MAD                                                                          1726
WEL               C                                                          1701
K1        Q             SMV                                                  1640
                                                                             1631
```

Fig. 7A




```
                MetTrpSerTrpLysCysLeuLeuPheTrpAlaValLeuValThrAla
  1 GGATCCACTGGGATGTGGAGCTGGAAGTGCCTCCTCTTCTGGGCTGTCCTGGTCACAGCC
    CCTAGGTGACCCTACACCTCGACCTTCACGGAGGAGAAGACCCGACAGGACCAGTGTCGG

    1 BAMHI,

                ThrLeuCysThrAlaAlaIleSerValThrMetAspAsnIleLeuSerGlyPheGluAsn
 61 ACACTCTGCACCGCGGCGATATCTGTCACAATGGATAATATCCTCTCAGGATTTGAAAAT
    TGTGAGACGTGGCGCCGCTATAGACAGTGTTACCTATTATAGGAGAGTCCTAAACTTTTA

    71 SAC2, 78 ECORV,

                GluTyrAspValIleTyrLeuLysProLeuAlaGlyValTyrArgSerLeuLysLysGln
121 GAATATGATGTTATATATTTAAAACCTTTAGCTGGAGTATATAGAAGCTTAAAAAAACAA
    CTTATACTACAATATATAAATTTTGGAAATCGACCTCATATATCTTCGAATTTTTTTGTT

    138 AHA3, 165 HIND3,

                IleGluLysAsnIlePheThrPheAsnLeuAsnLeuAsnAspIleLeuAsnSerArgLeu
181 ATTGAAAAAAACATTTTTACATTTAATTTAAATTTGAACGATATCTTAAATTCACGTCTT
    TAACTTTTTTTGTAAAAATGTAAATTAAATTTAAACTTGCTATAGAATTTAAGTGCAGAA

    207 AHA3, 220 ECORV, 238 AFL2,

                LysLysArgLysTyrPheLeuAspValLeuGluSerAspLeuMetGlnPheLysHisIle
241 AAGAAACGAAAATATTTCTTAGATGTATTAGAATCTGATTTAATGCAATTTAAACATATA
    TTCTTTGCTTTTATAAAGAATCTACATAATCTTAGACTAAATTACGTTAAATTTGTATAT

    251 SSPI, 289 AHA3,

                SerSerAsnGluTyrIleIleGluAspSerPheLysLeuLeuAsnSerGluGlnLysAsn
```

Fig. 7B

```
301  TCCTCAAATGAATACATTATTGAAGATTCATTTAAATTATTGAATTCAGAACAAAAAAAC
     AGGAGTTTACTTATGTAATAACTTCTAAGTAAATTTAATAACTTAAGTCTTGTTTTTTG

     331 AHA3, 342 ECORI,

     ThrLeuLeuLysSerTyrLysTyrIleLysGluSerValGluAsnAspIleLysPheAla
361  ACACTTTTAAAAAGTTACAAATATATAAAAGAATCAGTAGAAAATGATATTAAATTTGCA
     TGTGAAAATTTTTCAATGTTTATATATTTTCTTAGTCATCTTTTACTATAATTTAAACGT

     366 AHA3,

     GlnGluGlyIleSerTyrTyrGluLysValLeuAlaLysTyrLysAspAspLeuGluSer
421  CAGGAAGGTATAAGTTATTATGAAAAGGTTTTAGCGAAATATAAGGATGATTTAGAATCA
     GTCCTTCCATATTCAATAATACTTTTCCAAAATCGCTTTATATTCCTACTAAATCTTAGT

     IleLysLysValIleLysGluGluLysGluLysPheProSerSerProProThrThrPro
481  ATTAAAAAAGTTATCAAAGAAGAAAAGGAGAAGTTCCCATCATCACCACCAACAACACCT
     TAATTTTTTCAATAGTTTCTTCTTTTCCTCTTCAAGGGTAGTAGTGGTGGTTGTTGTGGA

     ProSerProAlaLysThrAspGluGlnLysLysGluSerLysPheLeuProPheLeuThr
541  CCGTCACCAGCAAAAACAGACGAACAAAAGAAGGAAAGTAAGTTCCTTCCATTTTTAACA
     GGCAGTGGTCGTTTTTGTCTGCTTGTTTTCTTCCTTTCATTCAAGGAAGGTAAAAATTGT

     AsnIleGluThrLeuTyrAsnAsnLeuValAsnLysIleAspAspTyrLeuIleAsnLeu
601  AACATTGAGACCTTATACAATAACTTAGTTAATAAAATTGACGATTACTTAATTAACTTA
     TTGTAACTCTGGAATATGTTATTGAATCAATTATTTTAACTGCTAATGAATTAATTGAAT

     649 PACl,

     LysAlaLysIleAsnAspCysAsnValGluLysAspGluAlaHisValLysIleThrLys
661  AAGGCAAAGATTAACGATTGTAATGTTGAAAAAGATGAAGCACATGTTAAAATAACTAAA
     TTCCGTTTCTAATTGCTAACATTACAACTTTTTCTACTTCGTGTACAATTTTATTGATTT

     LeuSerAspLeuLysAlaIleAspAspLysIleAspLeuPheLysAsnHisAsnAspPhe
721  CTTAGTGATTTAAAAGCAATTGATGACAAAATAGATCTTTTTAAAAACCATAACGACTTC
     GAATCACTAAATTTTCGTTAACTACTGTTTTATCTAGAAAAATTTTTGGTATTGCTGAAG

     729 AHA3, 753 BGL2, 760 AHA3, 778 ASU2 BSTBl,

     GluAlaIleLysLysLeuIleAsnAspAspThrLysLysAspMetLeuGlyLysLeuLeu
781  GAAGCAATTAAAAAATTGATAAATGATGATACGAAAAAAGATATGCTTGGCAAATTACTT
     CTTCGTTAATTTTTTAACTATTTACTACTATGCTTTTTTCTATACGAACCGTTTAATGAA

     SerThrGlyLeuValGlnAsnPheProAsnThrIleIleSerLysLeuIleGluGlyLys
841  AGTACAGGATTAGTTCAAAATTTTCCTAATACAATAATATCAAAATTAATTGAAGGAAAA
     TCATGTCCTAATCAAGTTTTAAAAGGATTATGTTATTATAGTTTTAATTAACTTCCTTTT

     885 ASEl,

     PheGlnAspMetLeuAsnIleSerGlnHisGlnCysValLysLysGlnCysProGluAsn
901  TTCCAAGATATGTTAAACATTTCACAACACCAATGCGTAAAAAAACAATGTCCAGAAAAT
     AAGGTTCTATACAATTTGTAAAGTGTTGTGGTTACGCATTTTTTTGTTACAGGTCTTTTA

     SerGlyCysPheArgHisLeuAspGluArgGluGluCysLysCysLeuLeuAsnTyrLys
961  TCTGGATGTTTCAGACATTTAGATGAAAGAGAAGAATGTAAATGTTTATTAAATTACAAA
     AGACCTACAAAGTCTGTAAATCTACTTTCTCTTCTTACATTTACAAATAATTTAATGTTT
```

Fig. 7C

```
      GlnGluGlyAspLysCysValGluAsnProAsnProThrCysAsnGluAsnAsnGlyGly
1021  CAAGAAGGTGATAAATGTGTTGAAAATCCAAATCCTACTTGTAACGAAAATAATGGTGGA
      GTTCTTCCACTATTTACACAACTTTTAGGTTTAGGATGAACATTGCTTTTATTACCACCT

      CysAspAlaAspAlaLysCysThrGluGluAspSerGlySerAsnGlyLysLysIleThr
1081  TGTGATGCAGATGCCAAATGTACCGAAGAAGATTCAGGTAGCAACGGAAAGAAAATCACA
      ACACTACGTCTACGGTTTACATGGCTTCTTCTAAGTCCATCGTTGCCTTTCTTTTAGTGT

      CysGluCysThrLysProAspSerTyrProLeuPheAspGlyIlePheCysSerAM AM
1141  TGTGAATGTACTAAACCTGATTCTTATCCACTTTTCGATGGTATTTTCTGCAGTTAGTAG
      ACACTTACATGATTTGGACTAAGAATAGGTGAAAAGCTACCATAAAAGACGTCAATCATC

      1159 BSABI, 1188 PSTI, 1200 SALI,

1201  TCGACCCTTGGAAGGATCC
      AGCTGGGAACCTTCCTAGG

      1214 BAMHI,

1261
```

Figure 8A

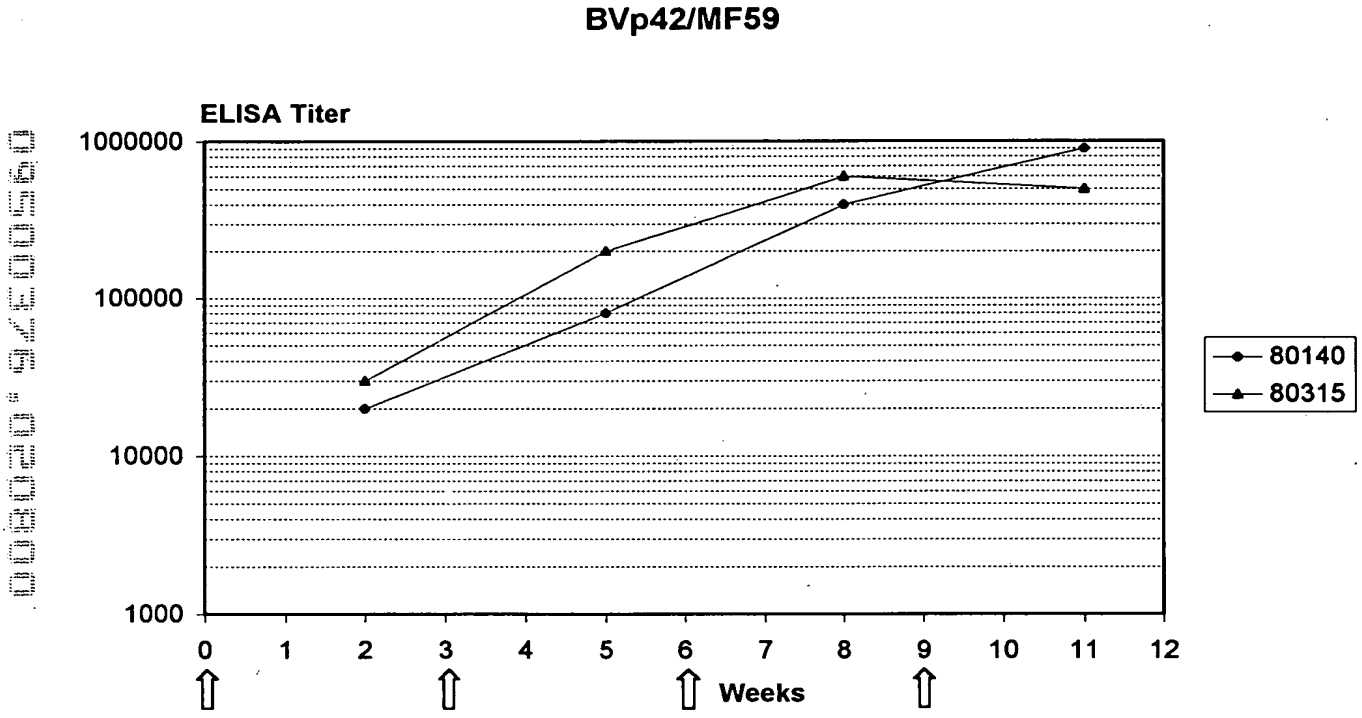

BVp42/MF59
ELISA Titer
1000000
100000
10000
1000
0
1
2
3
4
5
6
7
8
9
10
11
12
Weeks
80140
80315

Figure 8B

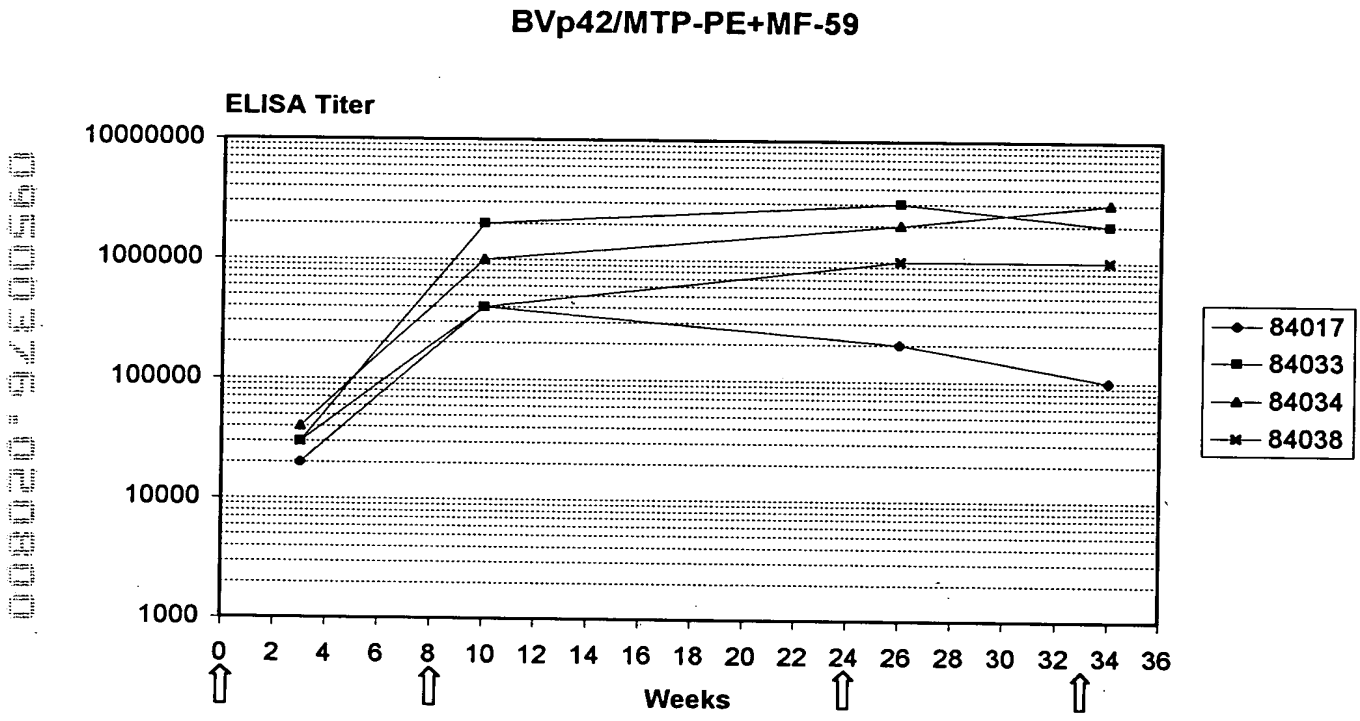
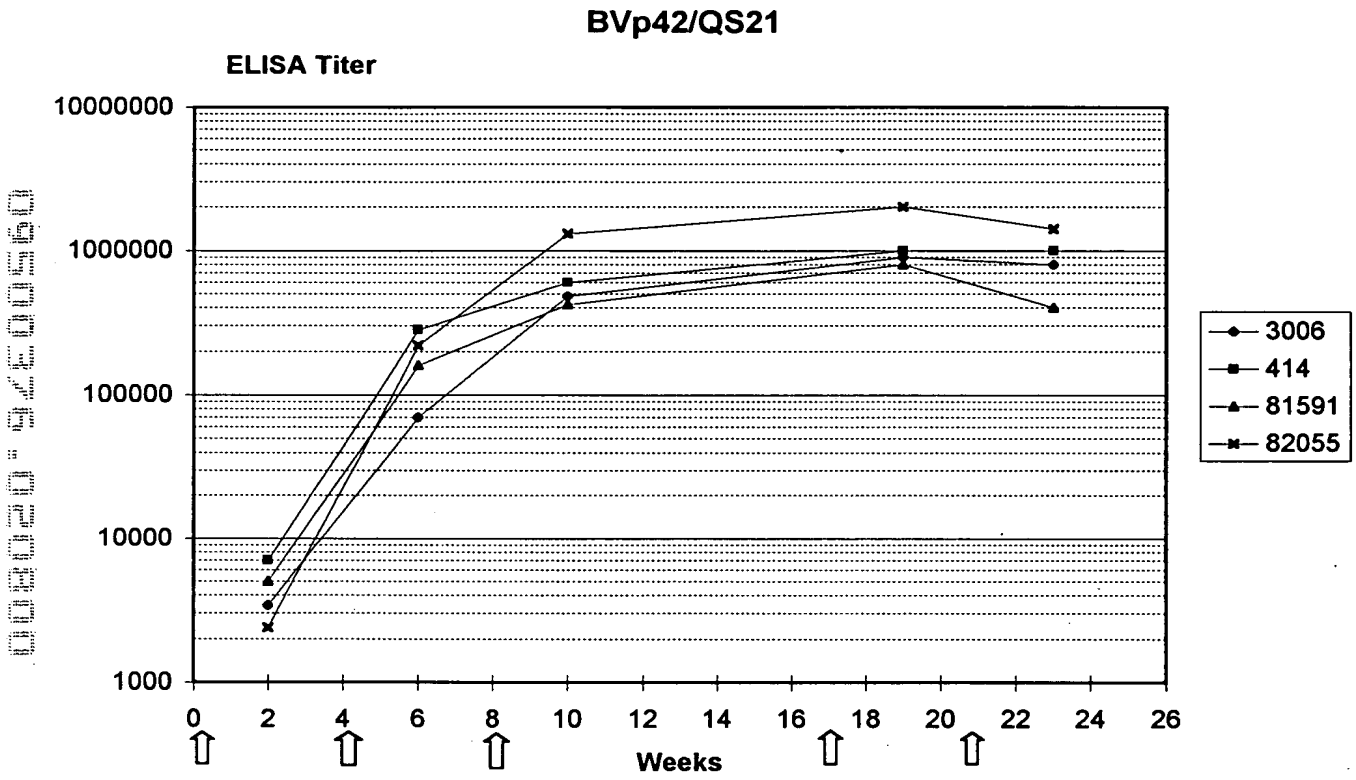

BVp42/MTP-PE+MF-59
ELISA Titer
10000000
1000000
100000
10000
1000
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36
Weeks
84017
84033
84034
84038

Figure 8C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ELISA Titer
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1000000
100000
10000
1000
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Weeks
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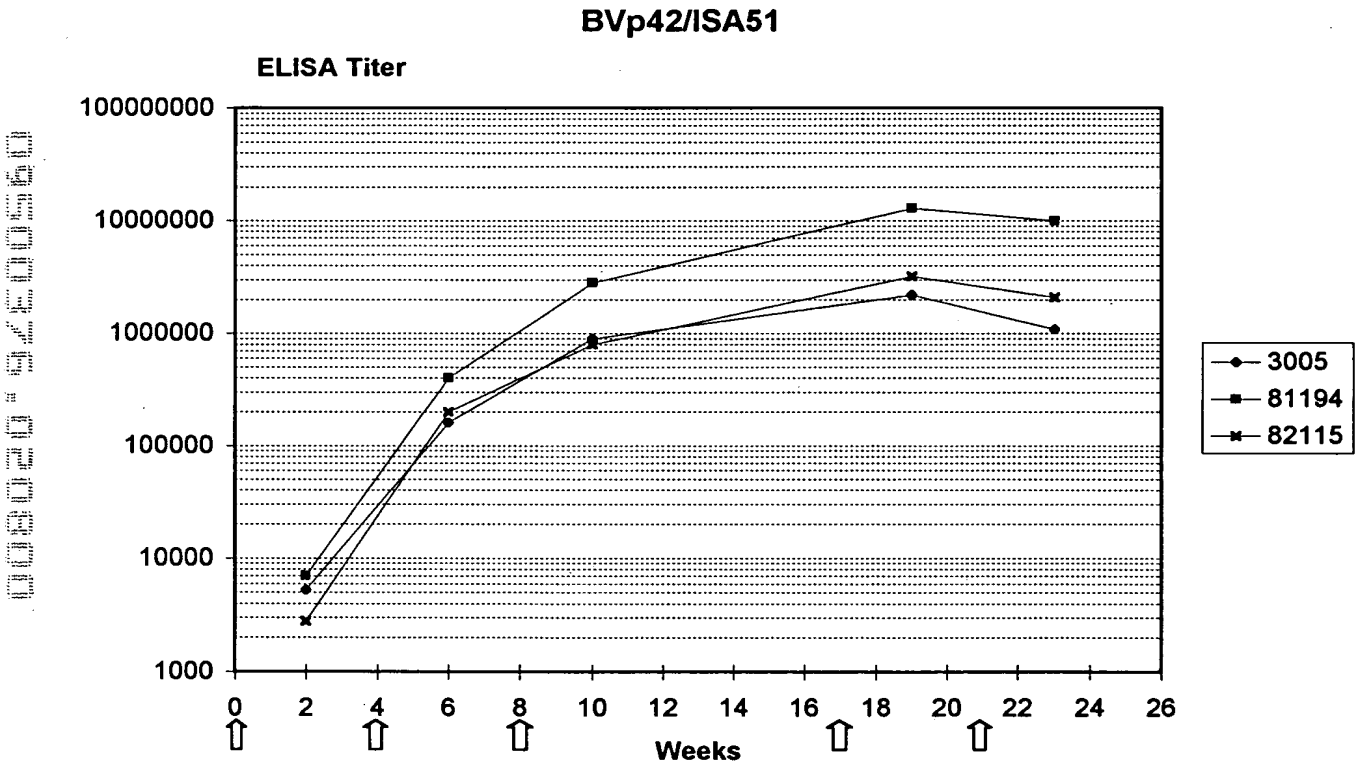
414
81591
82055

Figure 8D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ELISA Titer
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10000000
1000000
100000
10000
1000
0
2
4
6
8
10
12
14
16
18
20
22
24
26
Weeks
3005
81194
82115

FIGURE 9

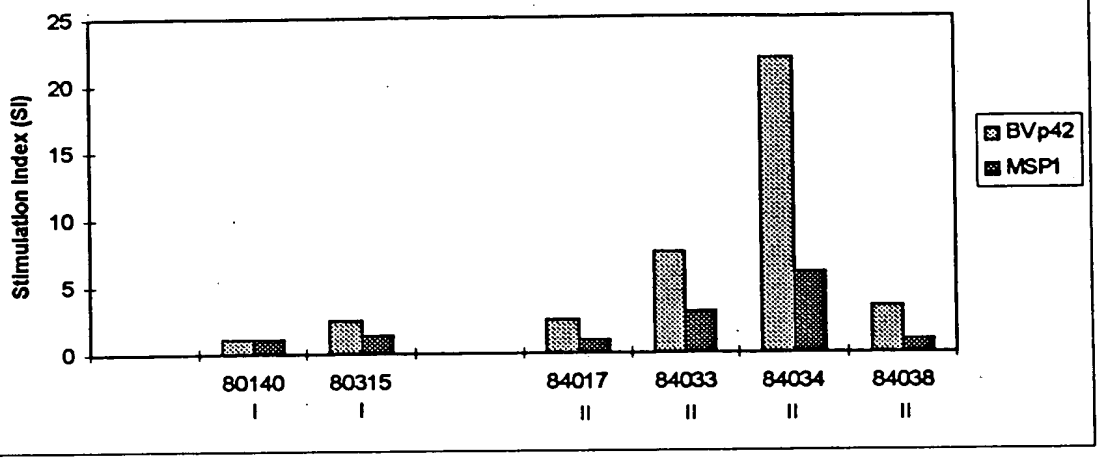

25
20
15
10
5
0
Stimulation Index (SI)
BVp42
MSP1
80140
I
80315
I
84017
II
84033
II
84034
II
84038
II

FIGURE 10A

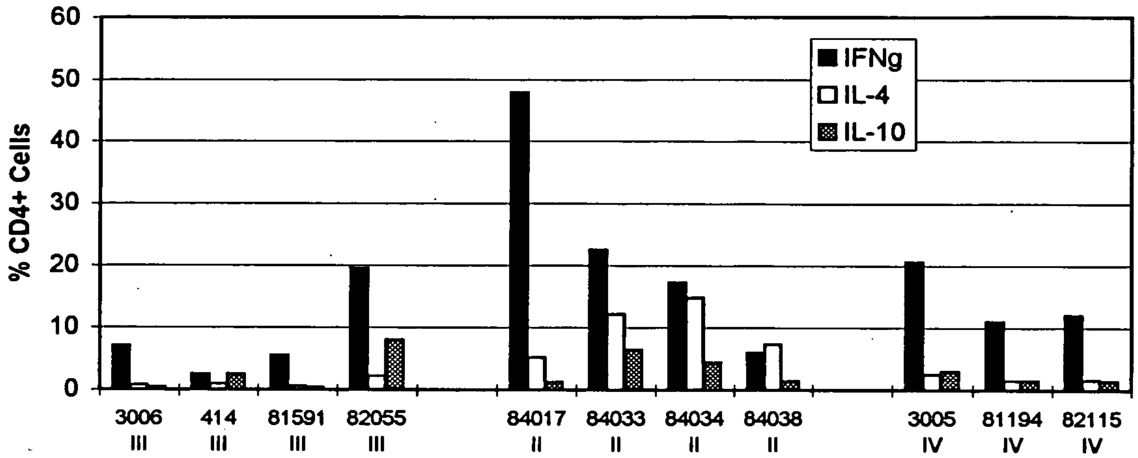
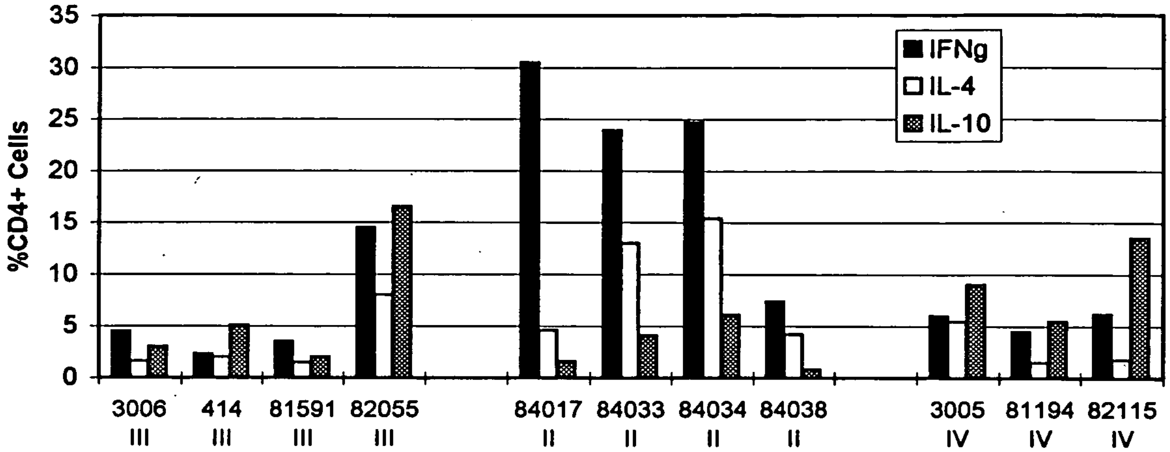


FIGURE 10B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30
25
20
15
10
5
0
%CD4+ Cells
IFNg
IL-4
IL-10
3006 III
414 III
81591 III
82055 III
84017 II
84033 II
84034 II
84038 II
3005 IV
81194 IV
82115 IV

FIGURE 11A

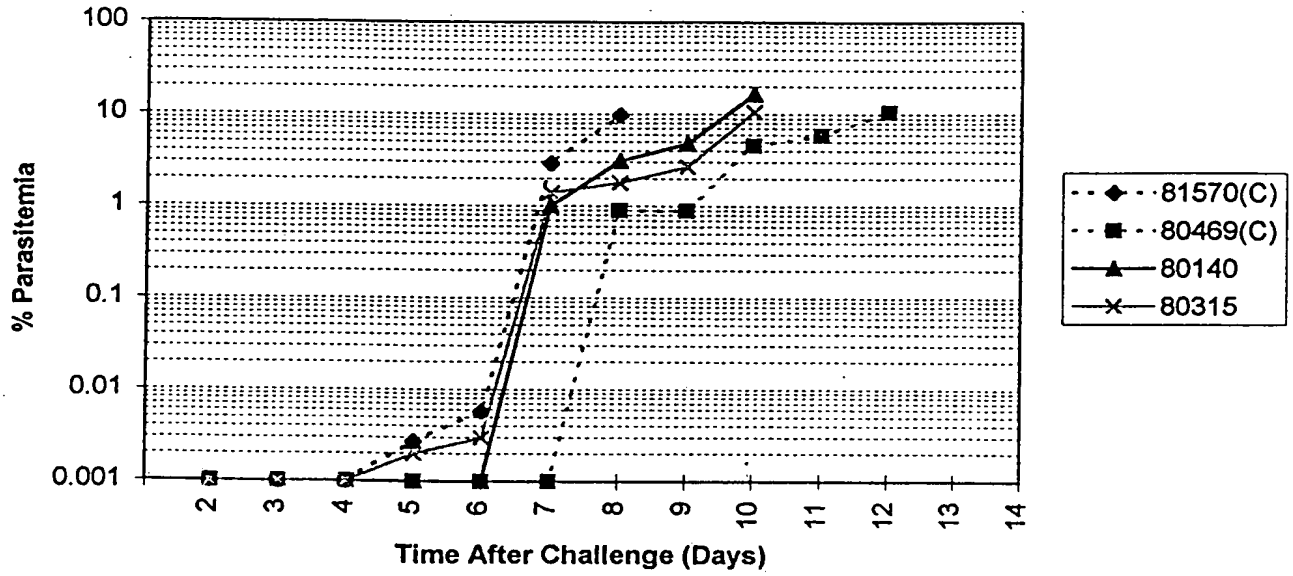

FIGURE 11B

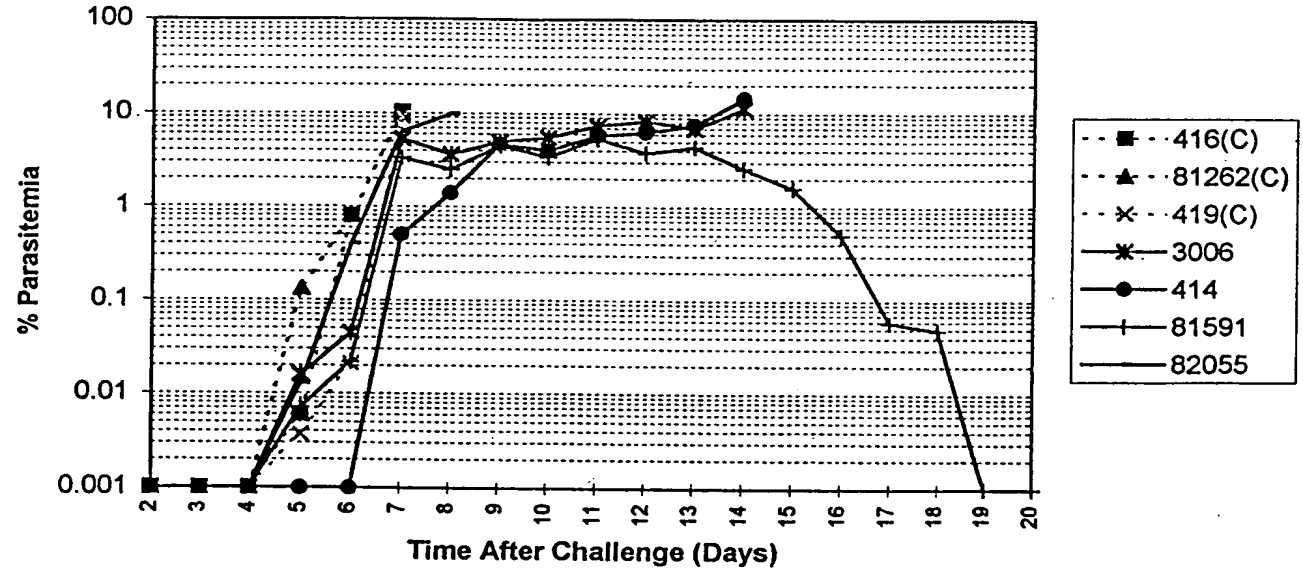

FIGURE 11C

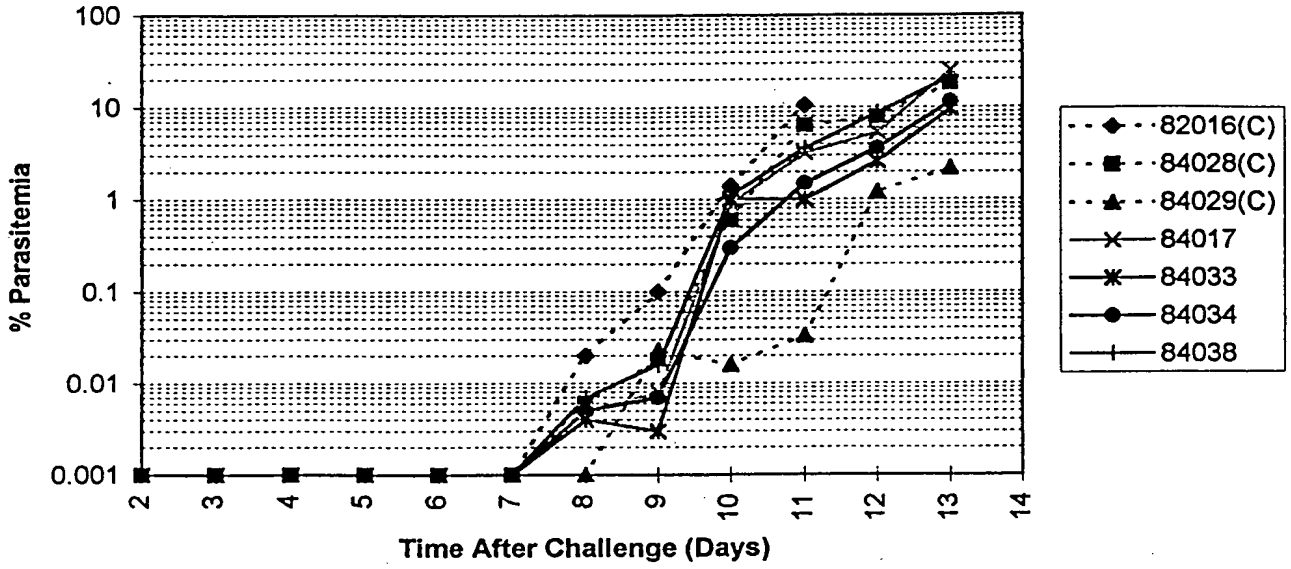

FIGURE 11D

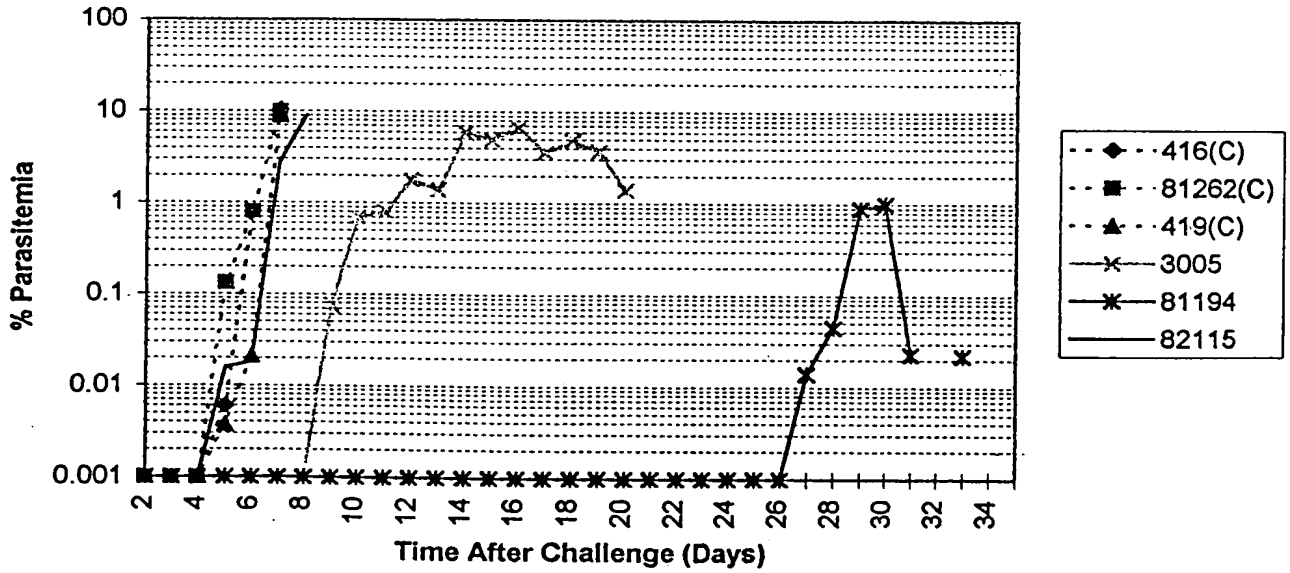

FIGURE 12

DNA AND AMINO ACID SEQUENCE OF BVp42-M

attggatccactaaa

```
  13 atgtggtcttggaagtgtcttttattctgggctgtcttggtgacc
     M  W  S  W  K  C  L  L  F  W  A  V  L  V  T
  58 gccactctttgcacagcagcgatctctgttactatggacaacatc
     A  T  L  C  T  A  A  I  S  V  T  M  D  N  I
 103 ctcagtggcttcgagaacgagtacgacgtaatctacctaaagccc
     L  S  G  F  E  N  E  Y  D  V  I  Y  L  K  P
 148 cttgccggtgtctaccgttcattgaagaaacagatagaaaagaat
     L  A  G  V  Y  R  S  L  K  K  Q  I  E  K  N
 193 attttcacgttcaacctcaacctaaatgacatcctcaactcgcgc
     I  F  T  F  N  L  N  L  N  D  I  L  N  S  R
 238 ctcaagaagcgaaaatacttcctcgacgtgttggaatccgacctt
     L  K  K  R  K  Y  F  L  D  V  L  E  S  D  L
 283 atgcaatttaagcacattagctctaacgagtacatcatagaggac
     M  Q  F  K  H  I  S  S  N  E  Y  I  I  E  D
 328 agcttcaagctcttgaattcagaacagaagaacaccctcctaaag
     S  F  K  L  L  N  S  E  Q  K  N  T  L  L  K
 373 tcctacaaatacattaaggagtctgttgagaacgacatcaagttc
     S  Y  K  Y  I  K  E  S  V  E  N  D  I  K  F
 418 gcccaggaaggaattagctactatgagaaagtcctggctaaatac
     A  Q  E  G  I  S  Y  Y  E  K  V  L  A  K  Y
 463 aaggacgacttggaaagcattaagaaggtaatcaaagaagagaag
     K  D  D  L  E  S  I  K  K  V  I  K  E  E  K
 508 gaaaagtttccgagctctccacccacaactcccccatcgcctgca
     E  K  F  P  S  S  P  P  T  T  P  P  S  P  A
 553 aagaccgacgagcagaaaaaagaaagtaagttccttccattcctc
     K  T  D  E  Q  K  K  E  S  K  F  L  P  F  L
 598 accaacatcgaaactctatataacaacctggtgaacaagattgat
     T  N  I  E  T  L  Y  N  N  L  V  N  K  I  D
 643 gactacttaatcaacttgaaggcgaaaattaatgactgtaacgtc
     D  Y  L  I  N  L  K  A  K  I  N  D  C  N  V
 688 gaaaaggatgaagcccacgttaagatcaccaagctttccgatctc
     E  K  D  E  A  H  V  K  I  T  K  L  S  D  L
 733 aaagccatcgacgataagattgacctgtttaagaaccacaacgat
     K  A  I  D  D  K  I  D  L  F  K  N  H  N  D
 778 ttcgacgcaatcaaaaagttgatcaacgacgatactaagaaagac
     F  D  A  I  K  K  L  I  N  D  D  T  K  K  D
 823 atgcttggaaaactgctgtcgacaggcttggtccaaaacttcccg
     M  L  G  K  L  L  S  T  G  L  V  Q  N  F  P
 868 aacaccattataagcaagctgatcgaaggaaagtttcaggatatg
```

FIGURE 12

```
          N   T   I   I   S   K   L   I   E   G   K   F   Q   D   M
      913 ctgaacatctctcagcatcaatgcgtgaagaagcaatgtcccgag
          L   N   I   S   Q   H   Q   C   V   K   K   Q   C   P   E
      958 aattcaggttgcttccgccacttagacgaaagggaggaatgtaaa
          N   S   G   C   F   R   H   L   D   E   R   E   E   C   K
     1003 tgcctgctgaattataaacaggaaggagacaagtgcgtagagaat
          C   L   L   N   Y   K   Q   E   G   D   K   C   V   E   N
     1048 cctaacccaacctgtaacgaaaataacggtggctgcgatgctgac
          P   N   P   T   C   N   E   N   N   G   G   C   D   A   D
     1093 gctaagtgtaccgaggaggacagcggttccaatggcaagaaaata
          A   K   C   T   E   E   D   S   G   S   N   G   K   K   I
     1138 acttgcgaatgcacgaagcccgatagttaccctctcttcgacggt
          T   C   E   C   T   K   P   D   S   Y   P   L   F   D   G
     1183 atcttctgctcc
          I   F   C   S

ccacctcatcatcatcatcattaataaggtaccta
P   P   H   H   H   H   H   H   *   *
```

FIGURE 14

DNA AND AMINO ACID SEQUENCE OF P42-K

```
   1 GGATCCCTAAAATGTGGAGCTGGAAGTGCCTCCTCTTCTGGGCTGTCCTG
                 M  W  S  W  K  C  L  L  F  W  A  V  L
  51 GTCACAGCCACACTCTGCACCGCGGGCGCCGCAGTAACTCCTTCCGTAAT
     V  T  A  T  L  C  T  A  G  A  A  V  T  P  S  V  I
 101 TGATAACATACTTTCTAAAATTGAAAATGAATATGAGGTTTTATATTTAA
      D  N  I  L  S  K  I  E  N  E  Y  E  V  L  Y  L
 151 AACCTTTAGCAGGTGTTTATAGAAGTTTAAAAAAACAATTAGAAAATAAC
     K  P  L  A  G  V  Y  R  S  L  K  K  Q  L  E  N  N
 201 GTTATGACATTTAATGTTAATGTTAAGGATATTTTAAATTCACGATTTAA
      V  M  T  F  N  V  N  V  K  D  I  L  N  S  R  F  N
 251 TAAACGTGAAAATTTCAAAAATGTTTTAGAATCAGATTTAATTCCATATA
       K  R  E  N  F  K  N  V  L  E  S  D  L  I  P  Y
 301 AAGATTTAACATCAAGTAATTATGTTGTCAAAGATCCATATAAATTTCTT
     K  D  L  T  S  S  N  Y  V  V  K  D  P  Y  K  F  L
 351 AATAAAGAAAAAAGAGATAAATTCTTAAGCAGTTATAATTATATTAAGGA
      N  K  E  K  R  D  K  F  L  S  S  Y  N  Y  I  K  D
 401 TTCAATAGATACGGATATAAATTTTGCAAATGATGTTCTTGGATATTATA
       S  I  D  T  D  I  N  F  A  N  D  V  L  G  Y  Y
 451 AAATATTATCCGAAAAATATAAATCAGATTTAGATTCAATTAAAAAATAT
     K  I  L  S  E  K  Y  K  S  D  L  D  S  I  K  K  Y
 501 ATCAACGACAAACAAGGTGAAAATGAGAAATACCTTCCCTTTTTAAACAA
      I  N  D  K  Q  G  E  N  E  K  Y  L  P  F  L  N  N
 551 TATTGAGACCTTATATAAAACAGTTAATGATAAAATTGATTTATTTGTAA
       I  E  T  L  Y  K  T  V  N  D  K  I  D  L  F  V
 601 TTCATTTAGAAGCAAAAGTTCTAAATTATACATATGAGAAATCAAACGTA
     I  H  L  E  A  K  V  L  N  Y  T  Y  E  K  S  N  V
 651 GAAGTTAAAATAAAAGAACTTAATTACTTAAAAACAATTCAAGACAAATT
      E  V  K  I  K  E  L  N  Y  L  K  T  I  Q  D  K  L
 701 GGCAGATTTTAAAAAAAATAACAATTTCGTTGGAATTGCTGATTTATCAA
       A  D  F  K  K  N  N  N  F  V  G  I  A  D  L  S
 751 CAGATTATAACCATAATAACTTATTGACAAAGTTCCTTAGTACAGGTATG
     T  D  Y  N  H  N  N  L  L  T  K  F  L  S  T  G  M
```

```
801  GTTTTTGAAAATCTTGCTAAAACCGTTTTATCTAATTTACTTGATGGAAA
      V  F  E  N  L  A  K  T  V  L  S  N  L  L  D  G  N
851  CTTGCAAGGTATGTTAAACATTTCACAACACCAATGCGTAAAAAAACAAT
       L  Q  G  M  L  N  I  S  Q  H  Q  C  V  K  K  Q
901  GTCCACAAAATTCTGGATGTTTCAGACATTTAGATGAAAGAGAAGAATGT
     C  P  Q  N  S  G  C  F  R  H  L  D  E  R  E  E  C
951  AAATGTTTATTAAATTACAAACAAGAAGGTGATAAATGTGTTGAAAATCC
      K  C  L  L  N  Y  K  Q  E  G  D  K  C  V  E  N  P
1001 AAATCCTACTTGTAACGAAAATAATGGTGGATGTGATGCAGATGCCAAAT
       N  P  T  C  N  E  N  N  G  G  C  D  A  D  A  K
1051 GTACCGAAGAAGATTCAGGTAGCAACGGAAAGAAAATCACATGTGAATGT
     C  T  E  E  D  S  G  S  N  G  K  K  I  T  C  E  C
1101 ACTAAACCTGATTCTTATCCACTTTTCGATGGTATTTTCTGCAGTCATCA
      T  K  P  D  S  Y  P  L  F  D  G  I  F  C  S  H  H
1151 TCATCATCATCATTAATAAGGTACC
       H  H  H  H  *  *
```

Underlined sequences represent restriction sites.
Bold letters represent alterations done to the leader sequence as described in the methods.
The boxed letter represents the original sequence where a mis-sense mutation to a cytosine occurred.
"*" represent stop codons.

FIGURE 14

FIGURE 15

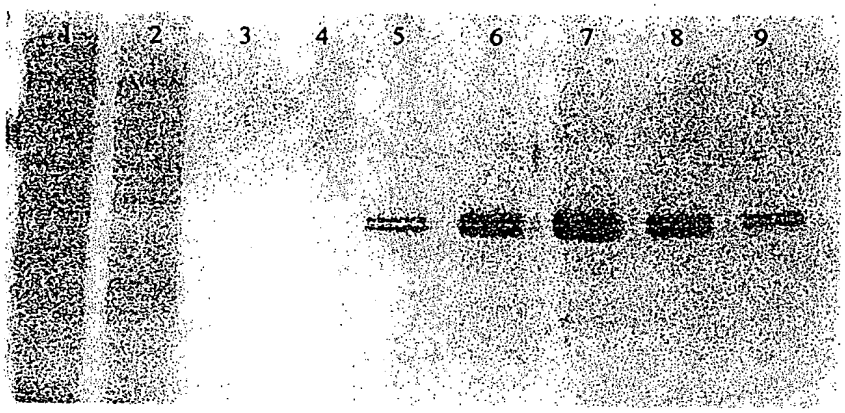

FIGURE 16

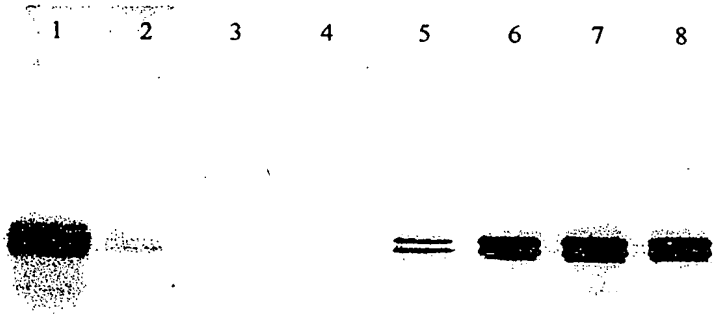

FIGURE 17

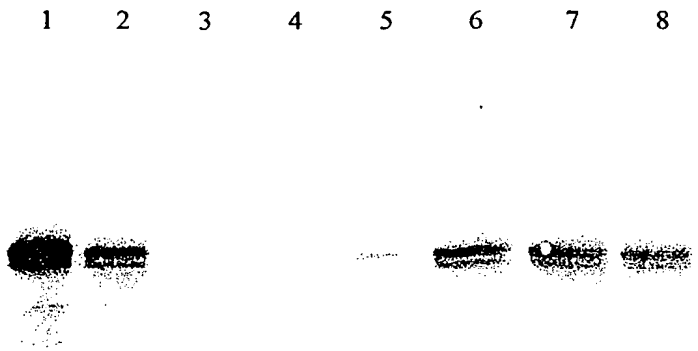

FIGURE 20

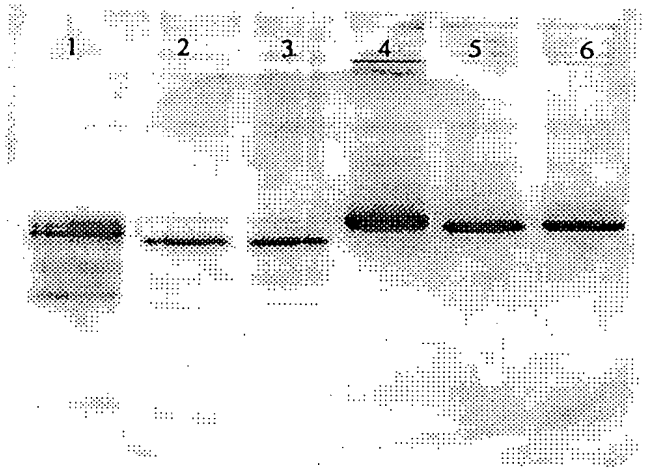

FIGURE 18A

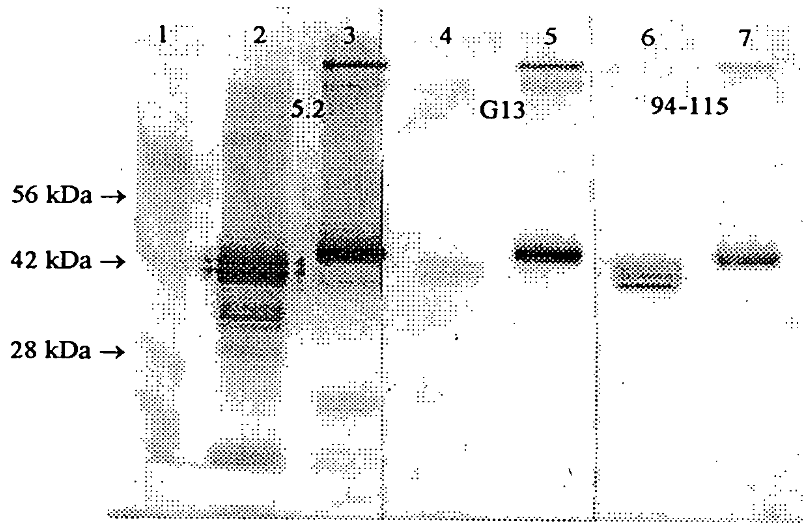

FIGURE 18B

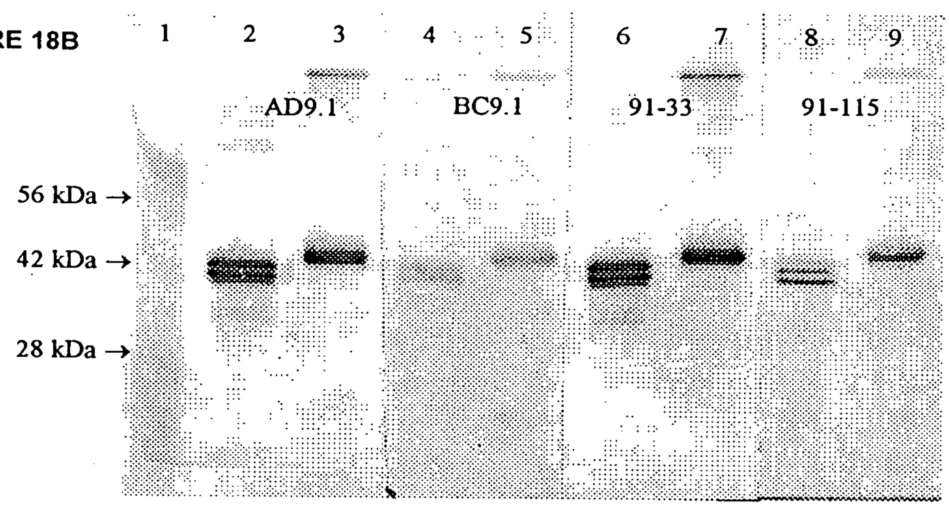

FIGURE 19A

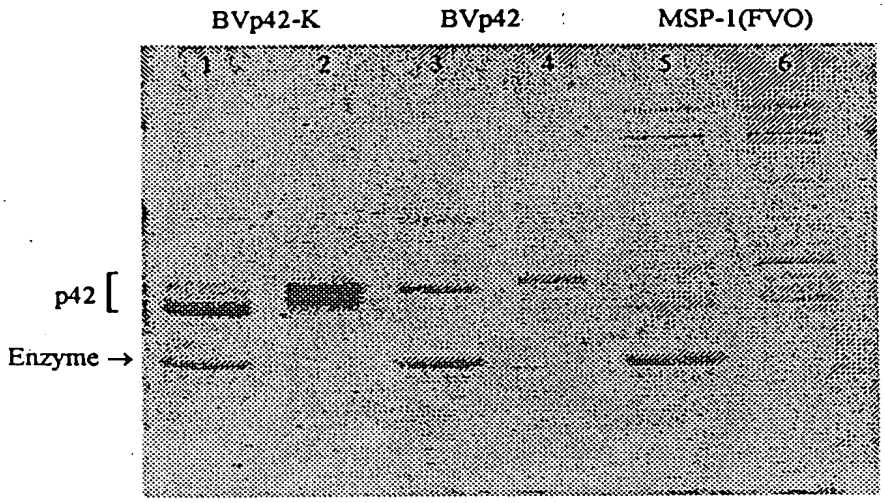

FIGURE 19B